

**Table B-4**  
**Analytical Methods and Reporting Limits**

Parameter	Analytical Method	Reporting Limit ( $\mu\text{g}/\text{L}$ )
<b>Conventional (mg/L)</b>		
Dissolved Organic Carbon	SM 5310B	500
<b>Total and Dissolved Metals (<math>\mu\text{g}/\text{L}</math>)</b>		
Copper	USEPA 1640	0.15
Zinc	USEPA 1640	0.15

Notes:

$\mu\text{g}/\text{L}$  = micrograms per liter

mg/L = milligrams per liter

SM = Standard Method

USEPA = U.S. Environmental Protection Agency

**Table B-5**  
**Frequencies for Quality Assurance/Quality Control Samples**

Analysis Type	Initial Calibration	Ongoing Calibration	Duplicates	Matrix Spikes	LCS/LCM	Method Blanks
Dissolved Organic Carbon	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Each batch
Total and Dissolved Metals	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Each batch

Notes:

LCM = laboratory control material

LCS = laboratory control sample

**Table B-6**  
**Data Quality Objectives**

Parameter	Precision	Accuracy <sup>1</sup>	Completeness
Dissolved Organic Carbon	± 25% RPD	75-125% R	95%
Total and Dissolved Metals	± 25% RPD	75-125% R	95%

Notes:

R = recovery

RPD = relative percent difference

1 Laboratory control sample and matrix spike/matrix spike duplicate percent recovery

# **ATTACHMENT 1**

## **SAMPLING FORMS**

---

### MdR Harbor Water Daily Sampling Log

Date \_\_\_\_\_ Crew \_\_\_\_\_

Station \_\_\_\_\_ Latitude \_\_\_\_\_ Longitude \_\_\_\_\_

Time at Start \_\_\_\_\_ Time at Finish \_\_\_\_\_

Visual Water Description \_\_\_\_\_

Picture Numbers \_\_\_\_\_

pH \_\_\_\_\_ Salinity \_\_\_\_\_

Temperature \_\_\_\_\_ Dissolved Oxygen \_\_\_\_\_

Other Notes \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Southern California Coastal Water Research Project

3535 Harbor Blvd. Suite 110  
Costa Mesa, CA 92626  
(714) 755-3200

## **Chain of Custody**

Date \_\_\_\_\_ Page \_\_\_\_ of \_\_\_\_

<b>Relinquished By</b>		<b>Relinquished By</b>		<b>Relinquished By</b>	
(Signature)	(Date)	(Signature)	(Date)	(Signature)	(Date)
(Printed Name)	(Time)	(Printed Name)	(Time)	(Printed Name)	(Time)
(Company)		(Company)		(Company)	
<b>Received By</b>		<b>Received By</b>		<b>Received By</b>	
(Signature)	(Date)	(Signature)	(Date)	(Signature)	(Date)
(Printed Name)	(Time)	(Printed Name)	(Time)	(Printed Name)	(Time)
(Company)		(Company)		(Company)	

**MARINA DEL REY HARBOR SITE SPECIFIC OBJECTIVES**  
**Probe Calibration Sheet**

Calibration Long		
Instrument	Date Calibrated	Initials
	Pre-calibration	Post-calibration
Sp. Conductivity (ms/cm)		
% DO		
Chlorophyll (ug/L)		
Pressure (m)		
pH		

Calibration Long		
Instrument	Date Calibrated	Initials
	Pre-calibration	Post-calibration
Sp. Conductivity (ms/cm)		
% DO		
Chlorophyll (ug/L)		
Pressure (m)		
pH		

Calibration Long		
Instrument	Date Calibrated	Initials
	Pre-calibration	Post-calibration
Sp. Conductivity (ms/cm)		
% DO		
Chlorophyll (ug/L)		
Pressure (m)		
pH		

Calibration Long		
Instrument	Date Calibrated	Initials
	Pre-calibration	Post-calibration
Sp. Conductivity (ms/cm)		
% DO		
Chlorophyll (ug/L)		
Pressure (m)		
pH		

Calibration Long		
Instrument	Date Calibrated	Initials
	Pre-calibration	Post-calibration
Sp. Conductivity (ms/cm)		
% DO		
Chlorophyll (ug/L)		
Pressure (m)		
pH		

Calibration Long		
Instrument	Date Calibrated	Initials
	Pre-calibration	Post-calibration
Sp. Conductivity (ms/cm)		
% DO		
Chlorophyll (ug/L)		
Pressure (m)		
pH		

Calibration Long		
Instrument	Date Calibrated	Initials
	Pre-calibration	Post-calibration
Sp. Conductivity (ms/cm)		
% DO		
Chlorophyll (ug/L)		
Pressure (m)		
pH		

Calibration Long		
Instrument	Date Calibrated	Initials
	Pre-calibration	Post-calibration
Sp. Conductivity (ms/cm)		
% DO		
Chlorophyll (ug/L)		
Pressure (m)		
pH		

---

## APPENDIX C

## TAC MEMBER PROFILES

---

---

*Work Plan*

*October 2018*

*Marina del Rey Harbor Site-Specific Objective Study*

**Richard F. Ambrose**

Professor, Department of Environmental Health Sciences, University of California, Los Angeles

**(a) Professional Preparation**

University of California, Irvine	Biological Sciences	B.S., 1975
University of California, Los Angeles	Ecology	Ph.D., 1982
Simon Fraser University	Ecology	Postdoc., 1983-84

**(b) Appointments**

- 1992-present Professor (2000-present) and Associate Professor (1992-2000), Department of Environmental Health Sciences and the Institute of the Environment and Sustainability, UCLA  
1998-2011 Director, Environmental Science and Engineering Program, UCLA  
1985-1992 Assistant/Associate Research Biologist, Marine Science Institute, University of California, Santa Barbara

**(c) Publications (Selected from 206 total, with 98 peer-reviewed journal articles)**

1. Doughty, C.L., K.C. Cavanaugh, R.F. Ambrose and E.D. Stein. *In press*. Evaluating regional resiliency of coastal wetlands to sea level rise through hypsometry-based modeling. *Global Change Biology*.
2. Rosencranz, J.A., K.M. Thorne, K.J. Buffington, J.Y. Takekawa, R.F. Hechinger, T.E. Stewart, R.F. Ambrose, G.M. MacDonald, M.A. Holmgren, J.A. Crooks, R.T. Patton, and K.D. Lafferty. 2018. Sea-level rise, habitat loss, and potential extirpation of a salt marsh specialist bird in urbanized landscapes. *Ecology and Evolution* 8: 8115-8125. DOI: 10.1002/ece3.4196.
3. Saarman, E.T., B. Owens, S.N. Murray, S.B. Weisberg, R.F. Ambrose, J.C. Field, K.J. Nielsen, and M.H. Carr. 2018. An ecological framework for informing permitting decisions on scientific activities in protected areas. *PLOS ONE* 13(6): e0199126. <https://doi.org/10.1371/journal.pone.0199126>.
4. Miner, C.M., J.L Burnaford, R.F Ambrose, L. Antrim, H. Bohlmann, C.A. Blanchette, J.M. Engle, S.C. Fradkin, R. Gaddam, C.D.G. Harley, B.G. Miner, S.N. Murray, J.R. Smith, S.G. Whitaker and P.T. Raimondi. 2018. Large-scale impacts of sea star wasting disease (SSWD) on intertidal sea stars and implications for recovery. *PLOS ONE* 13(3): e0192870. <https://doi.org/10.1371/journal.pone.0192870>.
5. Yap, T.A., M.S. Koo, R.F. Ambrose and V.T. Vredenberg. 2018. Historical evidence suggests introduced amphibian facilitated the invasion of a fungal pathogen to western North America. *PLOS ONE* 13(4): e0188384. <https://doi.org/10.1371/journal.pone.0188384>.
6. Thorne,K., G. MacDonald, G. Guntenspergen, R. Ambrose, K. Buffington, B. Dugger, C. Freeman, C. Janousek, L. Brown, J. Rosencranz, J. Holmquist, J. Smol, K. Hargan, J. Takekawa. 2018. U.S. Pacific coastal wetland resilience and vulnerability to sea-level rise. *Science Advances* 4:eaao3270. 10 pp. DOI: 10.1126/sciadv.aao3270.
7. Parker, E.A., M.A. Rippy, A.S. Mehring, B.K. Winfrey, R.F. Ambrose, L.A. Levin, and S.B. Grant. 2017. The Predictive Power of Clean Bed Filtration Theory for Fecal Indicator Bacteria Removal in Stormwater Biofilters. *Environmental Science and Technology* 51: 5703–5712. DOI: 10.1021/acs.est.7b00752.
8. Fong, L.S., E. D. Stein and R.F. Ambrose. 2017. Development of restoration performance curves for streams in southern California using an integrative condition index. *Wetlands* 37: 289-299.
9. Winfrey, B.K., B.E. Hatt and R.F. Ambrose. 2017. Arbuscular mycorrhizal fungi in Australian stormwater biofilters. *Ecological Engineering* 102: 483-489.
10. Rosencranz, J.R., L.N. Brown, J.R. Holmquist, Y. Sanchez, G.M MacDonald and R.F. Ambrose. 2017. The role of sediment dynamics for inorganic accretion patterns in southern California's Mediterranean-climate salt marshes. *Estuaries and Coasts*. DOI: 10.1007/s12237-017-0224-3.
11. Ambrose, R.F. 2017. Managing Sea Level Rise in Coastal Wetlands: Testing Thin Layer Sediment Augmentation as an Adaptation Strategy. Proceedings of the US-Iran Symposium on Wetlands, March 28-30, 2016, in Irvine, CA. University of Arizona, National Academies, and Sharif University of Technology. pp. 149-160.
12. Mehring, A.S., B.E. Hatt, D. Kraikittikun, B.D. Orello, M.A. Rippy, S.B. Grant, J.P. Gonzalez, S.C. Jiang, R.F. Ambrose and L.A. Levin. 2016. Soil invertebrates in Australian rain gardens and their potential roles in storage and processing of nitrogen. *Ecological Engineering* 97: 138-143.

13. Thorne, K.M., MacDonald, G.M., Ambrose, R.F., Buffington, K.J., Freeman, C.M., Janousek, C.N., Brown, L.N., Holmquist, J.R., Gutenspergen, G.R., Powelson, K.W., Barnard, P.L., and Takekawa, J.Y., 2016, Effects of climate change on tidal marshes along a latitudinal gradient in California: U.S. Geological Survey Open-File Report 2016-1125, 75 p. Available at: <http://dx.doi.org/10.3133/ofr20161125>.
14. Rosencranz, J.A., N.K. Ganju, R.F. Ambrose, S.M. Brosnahan, P.J. Dickhut, G.R. Guntenspergen, G.M. MacDonald, J.Y. Takekawa and K.M Thorne. 2016. Balanced sediment fluxes in southern California's Mediterranean-climate zone salt marshes. *Estuaries and Coasts*. . *Estuaries and Coasts* 39: 1035-1049. DOI 10.1007/s12237-016-0077-1. Erratum published online 17 February 2016.
15. Murray, S.N., S.B. Weisberg, P.T. Raimondi, R.F. Ambrose, C.A. Bell, C.A. Blanchette, J.L. Burnaford, M.N. Dethier, J.M. Engle M.S. Foster, C.M. Miner, K.J. Nielsen, J.S. Pearse, D.V. Richards, and J.R. Smith. 2016. Evaluating ecological states of West Coast rocky intertidal communities: A best professional judgment exercise. *Ecological Indicators* 60: 802-814.
16. Wang, W., Y.Ding, J.L. Ullman, R.F. Ambrose, Y. Wang, X. Song and Z. Zhao. 2016. Nitrogen removal performance in planted and unplanted horizontal subsurface flow constructed wetlands treating different influent COD/N ratios. *Environmental Science and Pollution Research*. Pages 1-7. Published online 29 January 2016. DOI 10.1007/s11356-016-6115-S
17. Ferguson, D., G.N. Talavera, L.R. Hernández, R.F. Ambrose, J.A. Jay and S. Weisberg. 2016. Virulence genes among *Enterococcus faecalis* and *Enterococcus faecium* isolated from coastal beaches and potential sources in southern California and Puerto Rico. *Journal of Pathogens*. 7 pages. DOI 10.1155/2016/3437214.
18. Yap, T.A., M.S. Koo, R.F. Ambrose, D.B. Wake and V.T. Vredenburg. 2015. Averting a biodiversity crisis. *Science* 349: 481-482.
19. Ambrose, R.F. and B.K. Winfrey. 2015. Comparison of stormwater biofiltration systems in southeast Australia and southern California. *WIREs Water* 2: 131-146. DOI: 10.1002/wat2.1064
20. Myers, M.R. and R.F. Ambrose. 2015. Salt marsh reduces fecal indicator bacteria input to coastal waters in southern California. *Bulletin of the Southern California Academy of Sciences* 114: 76-88.
21. Needles, L.A., S.E. Lester, R. Ambrose, A. Andren, M. Beyeler, M.S. Connor, J.E. Eckman, B.A. Costa-Pierce, S.D. Gaines, K.D. Lafferty, H.S. Lenihan, J. Parrish, M.S. Peterson, A.E. Scaroni, J.S. Weis, D.E. Wendt. 2015. Managing bay and estuarine ecosystems for multiple services. *Estuaries and Coasts* 38 (Suppl. 1): S35-S48.
22. Ambrose, R.F., J.H. Dorsey, K.K. Johnston, and E.D. Stein. 2015. State of the Bay Report. "Habitat Conditions: Coastal Wetlands." *Urban Coast* 5(1): 59-68. Available online: <http://urbancoast.org/>.
23. Altstatt, J., R. Ambrose, J. Carroll, J. Coyer, J. Wible and J. Engle. 2014. Eelgrass meadows return to Frenchy's Cove, Anacapa Island: Recovery ten years after successful transplantation. *Monographs of the Western North America Naturalist* 7: 500-517.
24. Zimmer-Faust, A.G., R.F. Ambrose and M.N. Tamburri. 2014. Evaluation of approaches to quantify total residual oxidants in ballast water management systems employing chlorine for disinfection. *Water Science and Technology* 70: 1585-1593. DOI: 10.2166/wst.2014.394.
25. Grant, S.B., J-D Saphores, D.L Feldman, A.J. Hamilton, T.D. Fletcher, P.L.M. Cook, M. Stewardson, B.F. Sanders, L.A. Levin, R.F. Ambrose, A. Deletic, R. Brown, S.C. Jiang, D. Rosso, W.J. Cooper and I. Marusic. 2012. Taking the "waste" out of "wastewater" for human water security and ecosystem sustainability. *Science* 337: 681-686.
26. Peterson, C.H.,S.S. Anderson, G.N. Cherr, R.F. Ambrose, S. Anghera, S. Bay, M. Blum, R. Condon, T.A. Dean, M. Graham, M. Guzy, S. Hampton, S. Joye, J. Lambrinos, B. Mate, D. Meffert, S.P. Powers, P. Somasundaran, R.B. Spies, C.M. Taylor, R. Tjeerdema, and E.E. Adams. 2012. A Tale of Two Spills: Novel Science and Policy Implications of an Emerging New Oil Spill Model. *Bioscience* 62: 461-469.
27. Willette, D.A. and R.F. Ambrose. 2012. Effects of the invasive seagrass *Halophila stipulacea* on the native seagrass, *Syringodium filiforme*, and associated fish and epibiota communities in the eastern Caribbean. *Aquatic Botany* 103: 74-82.
28. Coffman, G.C., R.F. Ambrose and P.W. Rundel. 2011. Wildfire promotes dominance by the invasive Giant Reed (*Arundo donax*) in riparian ecosystems. *Biological Invasions* 12: 2723-2734.
29. Stein, E.D., D. Ackerman, T. Hogue, S. Lopez, R. Ambrose and V. Chan. 2010. Effect of global climate change on southern California coastal wetlands. Report to the State of California Department of Water Resources.
30. Rothenberg, S.E., M.E. Kirby, B.W. Bird, M.B. DeRose, C. Lin, X. Feng, R.F. Ambrose and J.A. Jay. 2010. The impact of over 100 years of wildfires on mercury levels and accumulation rates in two lakes in southern California, USA. *Environmental Earth Sciences* 60: 993–1005.

31. Myers, M.R. and R.F. Ambrose. 2009. Differences in benthic cover inside and outside marine protected areas on the Great Barrier Reef: influence of protection or disturbance history? *Aquatic Conservation: Marine and Freshwater Ecosystems* 19: 736-747.
32. Smith, J.R., P. Fong and R.F. Ambrose. 2009. Spatial patterns in recruitment and growth of the mussel *Mytilus californianus* (Conrad) in southern and northern California, USA, two regions with differing oceanographic conditions. *Journal of Sea Research* 61: 165-173.
33. Willette, D.A. and R.F. Ambrose. 2009. The distribution and expansion of the invasive seagrass *Halophila stipulacea* in Dominica, West Indies, with a preliminary report from St. Lucia. *Aquatic Botany* 91:137-142.
34. Smith, J.R., P. Fong and R.F. Ambrose. 2008. The impacts of human visitation on mussel bed communities along the California coast: Are regulatory marine reserves effective in protecting these communities? *Environmental Management* 41: 599-612.
35. Rothenberg, S.E., R.F. Ambrose and J.A. Jay. 2008. Mercury cycling in surface water, pore water and sediments of Mugu Lagoon, CA., USA. *Environmental Pollution* 154: 32-45.
36. Pankratz, S., T. Young, H. Cuevas-Arellano, R. Kumar, R.F. Ambrose and I.H Suffet. 2007. The ecological value of constructed wetlands for treating urban run-off. *Water Science and Technology* 55: 63-69.
37. Tetreault, I. and R.F. Ambrose. 2007. Temperate marine reserves enhance targeted but not untargeted fishes in multiple no-take MPAs. *Ecological Applications* 17: 2251-2267.
38. Swenson, D.P. and R.F. Ambrose. 2007. A Spatial Analysis of Cumulative Habitat Loss in Southern California under the Clean Water Act Section 404 Program. *Landscape and Urban Planning* 82: 41-55.
39. Miller, A.W., G.M. Ruiz, M.S. Minton and R.F. Ambrose. 2007. Differentiating successful and failed molluscan invaders in marine ecosystems. *Marine Ecology Progress Series* 332: 41-51.
40. Raimondi, P., R. D. Sagarin, R. Ambrose, C. Bell, M. George, S. Lee, D. Lohse, C.M. Miner, and S. Murray. 2007. Consistent frequency of color morphs in the sea star *Pisaster ochraceus* (Echinodermata: Asteriidae) across open-coast habitats in the northeastern Pacific. *Pacific Science* 61: 197-206.
41. Sagarin, R.D., R.F. Ambrose, B.J. Becker, J.M. Engle, J. Kido, S.F. Lee, C.M. Miner, S.N. Murray, P.T. Raimondi, D.V. Richards, C. Roe. 2007. Ecological impacts on the limpet *Lottia gigantea* populations: human pressure over a broad scale on islands and mainland intertidal zones. *Marine Biology* 150: 399-415.
42. Smith, J.R., R.F. Ambrose, and P. Fong. 2006. Long-term change in mussel (*Mytilus californianus* Conrad) populations along the wave-exposed coast of California. *Marine Biology* 149: 537-545.
43. Smith, J.R., R.F. Ambrose, and P. Fong. 2006. Dramatic declines in mussel bed community diversity: Response to climate change? *Ecology* 87: 1153-1161.
44. Forrester, G.E., B.I. Fredericks, D. Gerdeman, B. Evans, M.A. Steele, K. Zayed, L.E. Schweitzer, I.H. Suffet, R.R. Vance and R.F. Ambrose. 2003. Correspondence between field-measured growth rates of fish from several California estuaries and the inferred toxicity of multiple sediment contaminants. *Marine Environmental Research* 56: 423-442.
45. Raimondi P., M. Wilson, R. Ambrose, J. Engle and T. Minchinton. 2002. Continued declines of black abalone along the coast of California: Are mass mortalities related to El Niño events? *Marine Ecology Progress Series* 242: 143-152.
46. Miller, A.W. and R.F. Ambrose. 2000. Optimum sampling of patchy distributions: Comparison of different sampling designs in rocky intertidal habitats. *Marine Ecology Progress Series* 196: 1-14.
47. Murray, S.N., R.F. Ambrose, J.A. Bohnsack, L.W. Botsford, M.H. Carr, G.E. Davis, P.K. Dayton, D. Gotshall, D.R. Gunderson, M.A. Hixon, J. Lubchenco, M. Mangel, A. MacCall, D.A. McArdle, J.C. Ogden, J. Roughgarden, R.M. Starr, M.J. Tegner and M.M. Yoklavich. 1999. No-take reserve networks: Protection for fishery populations and marine ecosystems. *Fisheries* 24: 11-25.
48. Palmer, M.A., R.F. Ambrose and N.L. Poff. 1997. Ecological theory and community restoration ecology. *Restoration Ecology* 5: 291-300.

**(d) Synergistic Activities**

Southern California Wetlands Recovery Project Science Advisory Panel; California Coastal Commission's Science Advisory Panels for the SONGS and Poseidon Mitigation Programs; Santa Monica Bay National Estuary Program Technical Advisory Committee; California Ocean Protection Council Science Advisory Team; California Marine Life Protection Act Initiative (South Coast) Science Advisory Team (2008-9); U.S. Army Corps of Engineers Environmental Advisory Board (2007-13); Science Advisory Committees for Malibu Lagoon Restoration (2003-5), Ballona Wetland Restoration (2005-9), Santa Clara River Estuary Restoration, Bunker Point Artificial Reef, Ormond Beach Wetland Restoration, Aliso Creek Estuary Restoration, Tijuana Estuary Restoration, San Elijo Lagoon Restoration.

## CURRICULUM VITAE

<u>NAME</u>	CAMPBELL, Peter G. C.
<u>ADDRESS</u>	Université du Québec, INRS-Eau, Terre et Environnement 490 de la Couronne, Quebec City, Quebec, Canada G1K 9A9 (phone +1-418-654-2538; fax +1-418-654-2600) E-mail: <a href="mailto:campbell@inrs.ca">campbell@inrs.ca</a>
<u>BIRTH/CITIZENSHIP</u>	May 4, 1943 / Canadian
<u>MARITAL STATUS</u>	Married, 3 children
<u>ACADEMIC QUALIFICATIONS</u>	
BSc (Honours): Bishop's University, 1963 Chemistry / Physics	
PhD: Queen's University, 1968 Organic / Organometallic Chemistry	
<u>AWARDS</u>	
2011	Distinguished Visiting Scientist award, CSIRO Land and Water, Australia
2010	Honorary doctorate, Université de Bordeaux I, Bordeaux, France
2006	Excellence in Review Award, Environmental Science and Technology Journal, American Chemical Society, Washington, DC, USA
2002	Elected Fellow, Royal Society of Canada
2001	Canada Research Chair, Metal Ecotoxicology
2001	Synergy Award for Innovation, Research and Development Partnerships, Natural Sciences and Engineering Research Council (NSERC) and Conference Board of Canada, co-winner with colleagues from McMaster University.
2000	Chandler-Misener Award, International Association for Great Lakes Research (jointly with Dr. M.R. Twiss)
1998	Ministère de l'Éducation nationale, de l'Enseignement supérieur et de la Recherche (MENESR, France), Accueil de chercheurs étrangers en France, Bourse de Haut Niveau
1994, 1986	Prix d'excellence en recherche, Institut national de la Recherche scientifique
1989	Association canadienne française pour l'avancement des sciences Prix Michel Jurdant (Environmental science): Co-winner with Dr. A. Tessier
1968 - 1970	National Research Council (Canada), postdoctoral fellowship
1964 - 1967	National Research Council (Canada), postgraduate scholarship
1963 - 1964	Woodrow Wilson Fellowship

**EXPERIENCE**

- 2016- **Emeritus Professor**, Université du Québec, Institut national de la recherche scientifique, INRS-Eau
- 1983 -2015 **Professor**, Université du Québec, Institut national de la recherche scientifique, INRS-Eau
- 1978-1982 **Director**, Université du Québec, Institut national de la recherche scientifique, INRS-Eau
- 1970-1978 Université du Québec, Institut national de la recherche scientifique, INRS-Eau,  
**Associate Professor**, 1973-78; **Assistant Professor**, 1970-73
- 1968-1970 Monash University, Department of Chemistry, Melbourne, Australia, **Postdoctoral Fellow** and Lecturer
- 
- 1999-2004 Metals in the Environment Research Network (MITE-RN), **Research Director** and **Principal Investigator** ([www.mite-rn.org](http://www.mite-rn.org))
- 2005-2009 Metals in the Human Environment Research Network (MITHE-RN), **Aquatic Theme Co-Director** ([www.mithe-rn.org](http://www.mithe-rn.org))
- 
- 2011-2012 CSIRO Land and Water Directorate, Environmental Contaminants Division, Adelaide
- 2004-2005 Laboratory, Waite Institute, Urrbrae, South Australia, **Visiting Scientist** (sabbatical leave)
- 1998 Université de Bordeaux I, Laboratoire d'écophysiologie et écotoxicologie des systèmes aquatiques (LEESA), Arcachon, France, **Visiting Professor** (sabbatical leave)
- 1997-1998 CSIRO Centre for Advanced Analytical Chemistry, Lucas Heights Research
- 1990-1991 Laboratories, Menai, New South Wales, Australia, **Visiting Scientist** (sabbatical leave)
- 1982-1983 Stanford University, Department of Civil Engineering, Environmental Engineering and Science Section, Stanford, California, USA, **Visiting Professor** (sabbatical leave)
- 1976-1977 Freshwater Biological Association, River Laboratory, East Stoke, Dorset, U.K.,  
**Visiting Scientist** (sabbatical leave)

**RESEARCH INTERESTS:**

Biogeochemistry of metals in the aquatic environment: current research topics include elements of analytical chemistry (development and refinement of methods to determine metal speciation), geochemistry (identification of factors controlling metal speciation in natural waters) and ecotoxicology (development of predictive models relating the biological response elicited by a metal to its speciation in the external medium). Metals of current interest include Al, Ag, Mn, Cd, Cu, Hg, Pb, Zn + Pd, Pd, La, Ce; target organisms include freshwater algae, rooted aquatic plants, benthic invertebrates, and fish. The biological responses of interest are metal bioaccumulation within the target organism, metal detoxification (transcriptome; proteome), and metal-induced changes in physiology and growth.

**COMMITTEES** (current)

- International Copper Association, International Lead Zinc Research Organization, Nickel Producers Environmental Research Association - Ecotoxicity Technical Advisory Panel (ETAP), Member 2000- ...
- International Scientific Council, Centre d'Écotoxicologie et Toxicologie Environnementale de Rovaltain, France, Member 2009-...; Chair 2014-...
- Co-editor, Cambridge Environmental Chemistry Series, Cambridge University Press, UK, 1988- .
- Editorial Board, Journal "*Revue des Sciences de l'Eau*" 1993- ...
- Editorial Board, Journal "*Environmental Chemistry*", 2004-... .

**PAST COMMITTEES** (partial list)

- Agence nationale de la Recherche, France, Comité Écosystèmes et Santé, Member, 2008-2010; Comité de sélection, BIOADAPT, 2011-2013
- Agence nationale de la Recherche, France), Comité sectoriel, Écosystèmes et Développement durable, Member 2010-2013.
- Society of Environmental Toxicology and Chemistry (SETAC), Advisory Group on Metals, Member 2000-2006.
- Environment Canada / Health Canada Chemical Management Plan (CMP) Science Committee, Member 2013-16 (<http://www.chemicalsubstanceschimiques.gc.ca/plan/sc-cs/index-eng.php>)
- Environment Canada, Categorization of inorganic substances on the Domestic Substances List (Canadian Environmental Protection Act), Inorganic Working Group, Member, 1999-2004.
- Canadian Foundation for Innovation, University Research Development Fund Committee, Member, 1999-2002.
- Natural Resources Canada, Aquatic Effects Technology Evaluation programme, Technical Committee; Member, 1995-98.
- Health Canada, Expert Steering Committee, Aluminum and animal neurotoxicity study, Member, 1999-2008.
- Natural Sciences and Engineering Research Council of Canada (NSERC), Advisory Committee on University-Industry Grants (ACUIG), Co-Chair, 2015-17.
- Natural Sciences and Engineering Research Council of Canada (NSERC), Advisory Committee on University-Industry Grants (ACUIG), Member, 2006-2009.
- Natural Sciences and Engineering Research Council of Canada (NSERC), Advisory Group on Interdisciplinary Research (AGIR), Member, 2000-2008.
- Natural Sciences and Engineering Research Council of Canada (NSERC), Committee on Collaborative Research Initiatives; Member 1991-95; Chair 1993-95.

- Natural Sciences and Engineering Research Council of Canada (NSERC), Interdisciplinary Grant Selection Committee; Member, 1988-1991; Chairman, 1989-1990.
- Fonds pour la Formation de Chercheurs et l'Aide à la Recherche (FCAR), Comité de sélection pour l'équipement de recherche, Member 1999-2000, Chair 2000-01.
- Fonds pour la Formation de Chercheurs et l'Aide à la Recherche (FCAR), Comité du programme <Centres de recherche>; Member 1986-1988; Chair 1987-1988.
- National Research Council of Canada (NRCC), Associate Committee on Hydrology; Member, 1985-1991; Executive committee, 1987-1990
- National Research Council of Canada (NRCC), Associate Committee on Scientific Criteria for Environmental Quality; Member, 1987-1991; Member, Water Subcommittee, 1983-1985; Member, Manganese working group, 1984-1986; Co-chairman, Working group on the bio-availability of metals in sediments, 1984-1988.
- National Research Council of Canada (NRCC), Committee on Marine Analytical Chemistry; Member, 1986-1989.
- Royal Society of Canada, Global Climate Change Program, Committee on Acid Precipitation; Member, 1989-92.
- Royal Society of Canada / U.S. National Academy of Sciences / Mexican Academia de la Investigacion Cientifica: Joint Committee on Acid Precipitation; Member, 1981-1985.
- International Joint Commission (Canada/U.S.A.), Great Lakes Science Advisory Board; Member 1985-1987.
- Hydro-Québec, Environmental Advisory Committee, 1988-1990.
- Canadian Association for Water Pollution Research and Control (CAWPRC), Executive, 1978-1982; 1983-90; Vice-president, development, 1989-1990.

#### CONFERENCES (partial list)

- Co-Chair, Symposium on Metallomics – Metal speciation in living cells, Canadian Society for Chemistry, May 2013, Quebec.
- Co-Chair, Symposium on Speciation and Bioavailability of Metals, Canadian Society for Chemistry, June 2011, Montreal.
- Co-Chair, Symposium on Site-specific Community-Based Risk Assessments for Metals, Society for Environmental Toxicology and Chemistry (SETAC), World Congress, August 2008, Sydney, Australia.
- Co-Chair, Symposium on Environmental Risk Analysis for Metals, Society for Environmental Toxicology and Chemistry (SETAC), Annual Meeting, November 2006, Montreal.
- Chair 4<sup>e</sup> Colloque annuel, Chapitre St-Laurent, Qualité de l'Environnement – concepts et outils, June 2000, Quebec
- Co-chair (with Dr. R.J. Allan), International Symposium on the Fate and Effects of Toxic Chemicals in Large Rivers and their Estuaries, October 1988, Quebec.

- Chair, International Symposium on Trace Metal Speciation, Canadian Society for Chemistry, June 1987, Quebec; Organizer, Scientific Programme, Analytical Chemistry Division, 70th Canadian Chemical Congress, June 1987, Quebec.
- Chair, International Symposium on Reservoir Ecology and Management (UNESCO/Hydro-Québec / James Bay Energy Society), June 1981, Quebec.

#### RECENT CONSULTATIONS (partial list)

- Natural Resources Canada, CANMET, Mine Environment Neutral Drainage (MEND) program, Report on *How to Assess Possible Biological Effects of Sub-Aqueous Disposal of Reactive Mine Tailings – Literature Review and Recommended Tools and Methodologies*, 2017-present.
- Grand Council of the Cree, Oujé-Bougoumou Cree Community. Co-chair of the Steering Committee overseeing the ecological risk assessment of metal mining activities in the traditional Cree territory near Chibougamau, Quebec, 2003-present.
- Rio Tinto Fer et Titane Inc. Geochemical characterization of the interstitial water and sediments of Lake Petit-Pas, Charlevoix, Quebec, 2008-2009; 2017-present.
- National Defence Canada. Evaluation of the bioavailability of silver present in drainage waters from the Munitions Experimental Test Centre, Nicolet, Quebec, 2007.
- Government of New Caledonia (“Province du Sud”). Member of the Expert committee formed to evaluate the environmental impacts of the effluent from the projected Goro nickel mine, 2006-2008.
- Broken Hill Proprietary (Melbourne, Australia). Member of Peer Review Committee formed to assess the effects of the Ok Tedi copper mine on the downstream environment, Papua New Guinea, 1997-2001.

#### MEMBERSHIP IN PROFESSIONAL SOCIETIES

Canadian Society for Chemistry (CSC), Ottawa

Association for the Sciences of Limnology and Oceanography (ASLO)

Society of Canadian Limnologists (SCL)

Society of Environmental Chemistry and Toxicology (SETAC)

#### PUBLICATIONS SUMMARY (Web of Science Researcher ID: H-4348-2011)

Articles in refereed journals	205
Publications in conference proceedings	36
Book chapters	23
Refereed reports	3
Technical reports	52
Edited volumes	2
Invited communications	41

# CURRICULUM VITAE: Gary N. Cherr

## **Office Address**

University of California Davis Bodega Marine Laboratory  
PO Box 247  
Bodega Bay, CA 94923  
Office: (707) 875-2051  
FAX: (707) 875-2009  
E Mail: [gnccherr@ucdavis.edu](mailto:gnccherr@ucdavis.edu)  
<http://bml.ucdavis.edu/research/faculty/gary-cherr/>

## **Home Address**

4971 Acacia Way  
Penngrove, CA 94951  
(707) 664-8284  
Cell (707) 799-9947

## **Education and Training:**

B.A. Biology, Sonoma State University, 1979  
Ph.D. Zoology, University of California, Davis 1984  
National Institutes of Health Postdoctoral Fellow, Department of Obstetrics and Gynecology,  
School of Medicine, University of California, Davis, 1983-1986.

**Areas of Specialization:** reproductive physiology, reproductive and developmental biology and toxicology, sperm cell physiology, embryo defense mechanisms, biochemistry and cell biology of environmental stress, endocrine disruption, environmental toxicology, oil spill impacts

## **Current Appointments:**

Director (2009-present), UC Davis Bodega Marine Laboratory  
Professor (1999-present), UC Davis Departments of Environmental Toxicology and Nutrition

## **Professional Experience:**

Acting Director, Bodega Marine Laboratory, 2007-2008  
Research Biologist (1993-1999), Bodega Marine Laboratory and Dept. Environmental Toxicology, University of California, Davis, 1999

## ***Service: University of California***

Study Section Member for Tobacco-Related Disease Research Program, Office of the President of the University of California, 1990  
Steering Committee for University of California at Santa Barbara, Southern California Education Initiative, U.S. Department of Interior, 1990-1994  
California Sea Grant College Program Advisory Board Member, 2003-present  
California Sea Grant College Program Advisory Board Chair, 2005-present  
University of California Marine Council, 2007-2008  
Executive Board, Cooperative Institute for Marine Ecosystems and Climate (NOAA and UC San Diego), 2011-2015.

## ***Service: Non-University***

Science Advisory Board, San Francisco Bay Estuary Project, 1988-1990  
Biomonitoring Science Advisory Board, Department of Ecology, State of Washington, 1991-1995  
Advisor, US Regional Marine Research Board, Pacific Northwest Region, Washington State Sea

Grant College Program, 1992-1993  
Protocol Review Committee, Water Resources Control Board, State of California, 1994-2000  
Technical Review Panel, Department of Ecology, State of Washington, 1998  
Toxicity Identification Evaluation Review Committee, US EPA, 1999-2000  
Organizer of 2000 Western Regional Developmental Biology Conference, Society for  
Developmental Biology, Bodega Marine Laboratory  
Exxon Valdez Oil Spill Trustee Council Science Panel, 2006-present  
State of California Resources Agency Science Sea Grant Advisory Panel, 2007-2010  
Technical Advisory Committee, Coastal Conservancy Creosote Removal Project, 2014-present

**Selected Publications (150 total):**

Cherr, G.N. and Wallis H. Clark, Jr. 1982. Fine structure of the envelope and micropyles in the eggs of the white sturgeon, *Acipenser transmontanus* Richardson. *Development Growth and Differentiation* 24:341-352.

Cherr, G.N. and W.H. Clark, Jr. 1984. An acrosome reaction in sperm from the white sturgeon, *Acipenser transmontanus*. *Journal of Experimental Zoology* 232(1):129-139.

Cherr, G.N. and W.H. Clark, Jr. 1985. Gamete interaction in the white sturgeon, *Acipenser transmontanus*: A morphological and physiological review. *Environmental Biology of Fishes* 14(1):11-22.  
Also in: *North American Sturgeons: Biology and Aquaculture Potential*, F. Binkowski and S. Doroshov (eds.), Dordrecht: Dr W. Junk: pp 11-22.

Cherr, G.N. and W.H. Clark, Jr. 1986. Induction of the acrosomal reaction in sperm from the white sturgeon, *Acipenser transmontanus*, pp 235-249, In: J.L. Hedrick (ed.) *The Molecular and Cellular Biology of Fertilization*, Plenum Publishing Corporation, New York, New York.

Cherr, G.N., J. Shenker, C. Lundmark and K.O. Turner. 1987. Toxic effects of selected bleached kraft mill effluent constituents on the sea urchin sperm cell. *Environmental Toxicology and Chemistry*, 6:561-569.

Cherr, G.N., J. Shoffner-McGee, and J.M. Shenker. 1990. Methods for assessing fertilization and embryonic/larval development in toxicity tests using the California mussel (*Mytilus californianus*). *Environmental Toxicology and Chemistry*, 9:1137-1145.

Shenker, J.M., and G.N. Cherr. 1990. Toxicity of zinc and bleached kraft mill effluent to larval English sole (*Parophrys vetulus*) and topsmelt (*Atherinops affinis*) *Archives of Environmental Contamination and Toxicology*, 19:680-686.

Cherr, G.N. 1990. Toxicity tests for *Mytilus californianus* (California mussel). In: *Proceedings of A Workshop on Culture and Toxicity Testing of West Coast Marine Organisms*. G.A. Chapman, ed., U.S. Environmental Protection Agency Publication pp. 89-94.

Gary N. Cherr, Ph.D.  
Curriculum Vitae

Cherr, G.N., R.G. Summers, J.D. Baldwin, and J.B. Morrill. 1992. Preservation and visualization of the sea urchin blastoceanic extracellular matrix. *Microscopy Research and Technique*, 22:11-22.

Baldwin, J.D., M.C. Pillai, and G.N. Cherr. 1992. The response of sea urchin (*Strongylocentrotus purpuratus*) embryos to aqueous petroleum wastes includes the expression of a high molecular weight glycoprotein. *Marine Biology*, 114: 21-30.

Pillai, M.C., J.D. Baldwin, and G.N. Cherr. 1992. Early development in an algal gametophyte: Role the cytoskeleton in germination and nuclear translocation. *Protoplasma*, 170:34-45. DOI: 10.1007/BF01384455

Yanagimachi, R., G.N. Cherr, M.C. Pillai, and J.D. Baldwin. 1992. Factors controlling sperm entry into the micropyles of salmonid and herring eggs. *Development, Growth, Differentiation*, 34:447-461.

Higashi, R.M., G.N. Cherr, J.M. Shenker, J.M. Macdonald, and D.G. Crosby. 1992. A Polar high molecular mass constituent of bleached kraft mill effluent is toxic to marine organisms. *Environmental Science and Technology*, 26:2413-2420.

Higashi, R.M., G.N. Cherr, C.A. Bergens, T.W-M. Fan, and Crosby, D.G. 1992. Toxicant isolation from a produced water source in the Santa Barbara Channel. In: *Produced Water: Technological/Environmental Issues and Solutions*. J. P. Ray and F.R. Engelhardt, eds. Plenum Press, New York. pp. 223-233.

Pillai, M.C., T.S. Shields, R. Yanagimachi, and G.N. Cherr. 1993. Isolation and partial characterization of the sperm motility initiation factor from eggs of the Pacific Herring, *Clupea pallasi*. *Journal of Experimental Zoology*, 265:336-342.

Cherr, G.N., T.W-M. Fan, M.C. Pillai, T. Shields, and R.M. Higashi. 1993. Electrophoretic separation, characterization, and quantification of biologically active lignin-derived macromolecules. *Analytical Biochemistry*, 214:521-527.

Garman, G.D., M.C. Pillai, and G.N. Cherr. 1994. Inhibition of cellular events during algal gametophyte development: Effects of select metals and an aqueous petroleum waste. *Aquatic Toxicology*, 28:127-144.

Pillai, M.C., R. Yanagimachi, and G.N. Cherr. 1994. *In vivo* and *in vitro* initiation of sperm motility using fresh and cryopreserved gametes from the Pacific herring, *Clupea pallasi*. *Journal of Experimental Zoology*, 269:62-68.

Garman, G.D., M.C. Pillai, L.J. Goff, and G.N. Cherr. 1995. Nuclear events during early development in *Macrocystis pyrifera* gametophytes and the temporal effects of a marine contaminant. *Marine Biology*, 121:355-362.

Griffin, F.J., C. Vines, M.C. Pillai, R. Yanagimachi, and G.N. Cherr. 1996. Sperm Motility

- Initiation Factor (SMIF) is a minor component of the Pacific herring egg chorion.  
*Development, Growth, and Differentiation*, 38:193-202.
- Spangenberg, J.M. and G.N. Cherr. 1996. Developmental effects of barium in a marine bivalve (*Mytilus californianus*). *Environmental Toxicology and Chemistry*, 15(10):1769-1774.
- Pillai, M.C., H. Blethow, R.M. Higashi, C.A. Vines, and G.N. Cherr. 1997. Inhibition of the sea urchin sperm acrosome reaction by a lignin-derived macromolecule. *Aquatic Toxicology*, 37:139-156.
- Garman, G.D., S.L. Anderson, and G.N. Cherr. 1997. Developmental abnormalities and DNA-protein crosslinks in sea urchin embryos exposed to three metals. *Aquatic Toxicology*, 39:247-265.
- Griffin, F.J., M.C. Pillai, C.A. Vines, R. Yanagimachi, and G.N. Cherr. 1998. Effects of salinity on sperm motility, fertilization, and development in the Pacific herring, *Clupea pallasi*.. *Biological Bulletin*, 194:25-35. DOI: 10.2307/1542510
- Shamseldin, A.A., J.S. Clegg, C.S. Friedman, G.N. Cherr, and M.C. Pillai. 1997. Induced thermotolerance in the Pacific oyster, *Crassostrea gigas*. *Journal of Shellfish Research*, 16(2):487-491.
- Middaugh, D.P., M.E. Shelton, C.L. McKenney Jr., G.N. Cherr, P.J. Chapman, and L.A. Courtney. 1998. Preliminary observations on responses of embryonic and larval Pacific herring, *Clupea pallasi*, to neutral fraction biodegradation products of weathered Alaska North Slope oil. *Archives Environmental Contamination and Toxicology*, 34:188-196.
- Clegg, J.S., K. R. Uhlinger, S.A. Jackson, G.N. Cherr, E. Rifkin, and C.S. Friedman. 1998. Induced thermotolerance and the heat shock protein-70 family in the Pacific oyster, *Crassostrea gigas*. *Molecular Marine Biology and Biotechnology*, 7(1):21-30.
- Vines, C.A., F.J. Griffin, M.C. Pillai, and G.N. Cherr. 2000. The effects of soluble creosote-derived compounds on development of Pacific herring embryos. *Aquatic Toxicology*. 51:225-239.
- Huovinen, P.S., G.N. Cherr, A. Oikari, and M.R. Soimauro. 2001. Heat shock protein (HSP70) responses in algae and cladoceran upon exposure to UV radiation. In: Proceedings of the 5<sup>th</sup> Finnish Conference of Environmental Sciences, T. Lehtonen, J.P. Salminen, and K. Pihlaja, eds. pp225-228.
- Moore, J.D., G.N. Cherr, and C.S. Friedman. 2001. Detection of *Candidatus xenohaliotis californiensis*' (Rickettsiales-like prokaryote) inclusions in tissue squashes of abalone (*Haliotis spp.*) gastrointestinal epithelium using a nucleic acid fluorochrome. *Diseases of Aquatic Organisms*, 46(2):147-152.

Vines, C.A., K. Yoshida, F.J. Griffin, M.C. Pillai, M. Morisawa, R. Yanagimachi and G.N. Cherr. 2002. Motility Initiation in Herring Sperm is Regulated by Reverse Sodium-Calcium Exchange. *Proceedings of the National Academy of Sciences, USA* 99:2026-2031.

G.N. Cherr. 2002. Can we develop and utilize indicators of ecological integrity to successfully manage ecosystems? In: *Managing for Ecosystem Health*, Third International Congress on Ecosystem Health, C.O. Qualset, D.J. Rapport, D. Ralston and B. Lasley , eds. CRC Press, in press. pp227-229.

Hamdoun, A.M., F.J. Griffin, and G.N. Cherr. 2002. Tolerance to Biodegraded Crude Oil in Marine Invertebrate embryos and larvae is associated with expression of a multixenobiotic resistance transporter. *Aquatic Toxicology*, 61:127-140.

Morisawa, S. and G.N. Cherr. 2002. Acrosome reaction in spermatozoa from hagfish (Agnatha) *Eptatretus burgeri* and *E. stouti*: Acrosomal exocytosis and the identification of filamentous actin. *Development, Growth and Differentiation*, 44:337-344.

Pillai, M.C., C.A. Vines, A.H. Wikramanayake and G.N. Cherr. 2003. Polycyclic aromatic hydrocarbons disrupt axial development in sea urchin embryos through a Beta-Catenin dependent pathway. *Toxicology*, 186: 93-108.

Hamdoun, A.M., Cheney, D.P., and G.N. Cherr. 2003. Phenotypic plasticity of HSP70 and HSP70 gene expression in the Pacific oyster (*Crassostrea gigas*): Implications for thermal limits and induction of thermal tolerance. *Biological Bulletin*, 205:160-169.

Griffin, F.J., M.R. Brenner, H.M. Brown, E.H. Smith, C.A. Vines, and G.N. Cherr. 2004. Survival of Pacific herring larvae is a function of external salinity. In: Larval Fish Ecology in the San Francisco Estuary and Watershed, *American Fisheries Society Symposium*, 39:37-46.

Watters, D.L., H.M. Brown, F.J. Griffin, E.J. Larson, and G.N. Cherr. 2004. Pacific Herring spawning grounds in San Francisco Bay: 1973- 2000. In: Larval Fish Ecology in the San Francisco Estuary and Watershed, *American Fisheries Society Symposium*, 39:1-9.

Brown, H.M., A. Briden, T. Stokell, F.J. Griffin, and G.N. Cherr. 2004. Thermotolerance and Hsp70 Profiles in Adult and Embryonic California Native Oysters, *Ostrea conchaphila* (Carpenter, 1857). *Journal of Shellfish Research*, 23(1):135-141.

Hamdoun, A.M., G.N. Cherr, T.A. Roepke, and D. Epel. 2004. Activation of multidrug efflux transporter activity at fertilization in sea urchin embryos (*Strongylocentrotus purpuratus*). *Developmental Biology*, 276:452-462.

Roepke, T.A., M.J. Snyder, and G.N. Cherr. 2005. Estradiol and endocrine disrupting compounds adversely affect development of sea urchin embryos at environmentally relevant concentrations. *Aquatic Toxicology*, 71:155-173.

Gary N. Cherr, Ph.D.  
Curriculum Vitae

- Rose, W.L., J. Hobbs, R. Nisbet, P.G. Green, G. Cherr, S.A. Anderson. 2005. Validation of Otolith Growth Rate Analysis Using Cadmium-Exposed Larval Topsmelt (*Atherinops affinis*). *Environmental Toxicology and Chemistry*, 24(10):2612-2620.
- Friedman, C.S., H.M. Brown, T.W. Ewing, F.J. Griffin, and G.N. Cherr. 2005. Pilot study of the Olympia oyster *Ostrea conchaphila* in the San Francisco Bay estuary: Description and distribution of diseases. *Diseases of Aquatic Organisms*, 65:1-8.
- Anderson, S.L., G.N. Cherr, S.G. Morgan, C.A. Vines, R.M. Higashi, W.A. Bennett, W.L. Rose, A. Brooks, R.M. Nisbet. 2006. Integrating contaminant responses in indicator saltmarsh species. *Marine Environmental Research*, 62:S317-S321.
- Roepke, T.A., E.S. Chang, and G.N. Cherr. 2006. Maternal exposure to estradiol and endocrine disrupting compounds alters the sensitivity of sea urchin embryos and the expression of an orphan steroid receptor. *Journal of Experimental Zoology*, 305A:830-841.
- Cao, Y., G. N. Cherr, A. L. Córdova, T.W.-M. Fan, R.M. Higashi, M. G. LaMontagne, K.M. Scow, J. Yuan, and P. A. Holden. 2006. Relationships between Sediment Microbial Communities and Pollutants in Two California Salt Marshes. *Microbial Ecology*, 52:619-633.
- Roepke, T.A., A.M. Hamdoun, and G.N. Cherr. 2006. Increase in multidrug transport activity is associated with oocyte maturation in sea stars. *Development, Growth, Differentiation*, 48(9):559-574.
- Rose, W.L., R.M. Nisbet, P.G. Gree, S. Norris, T. Fan, E.H. Smith, G.N. Cherr, and S.L. Anderson. 2006. Using an integrated approach to link biomarker responses and physiological stress to growth impairment of cadmium-exposed larval topsmelt. *Aquatic Toxicology*, 80:298-308.
- Arkush, K.D., G.N. Cherr, and J.S. Clegg. 2008. Induced thermotolerance and tissue Hsc70 in juvenile coho salmon, *Oncorhynchus kisutch*. *Acta Zoologica*, 89:331-338.
- Cherr, G.N., M. Morisawa, C.A. Vines, K. Yoshida, E.H. Smith, T. Matsubara, M.C. Pillai, F.J. Griffin, and R. Yanagimachi. 2008. Role of two egg-derived molecules in sperm motility initiation and fertilization in the Pacific herring (*Clupea pallasi*). *International Journal of Developmental Biology*, 52:743-752.
- Griffin, F.J., E.H. Smith, C.A. Vines, and G.N. Cherr. 2009. Impacts of suspended sediments on fertilization, embryonic development, and early larval life stages of the Pacific Herring, *Clupea pallasi*. *Biological Bulletin*, 216:175-187.
- Keller, A.A., H. Wang, D. Zhou, H. Lenihan, G.N. Cherr, B. Cardinale and R. Miller. 2010. Behavior of metal oxide nanoparticles in natural aqueous matrices. *Environmental Science & Technology*, 44:1962-1967.

- Murata, K., W. Nunomura, Y. Takakuwa, and G.N. Cherr. 2010. Two different unique cardiac isoforms of protein 4.1R in zebrafish, *Danio rerio*, and insights into their cardiac functions as related to their unique structures. *Development, Growth, and Differentiation*. 52:591-602.
- Werlin, R., J. H. Priester, Mielke, R. E., Kraemer, S. Jackson, S., P. K. Stoimenov, G.D Stucky, G.N.Cherr, E. Orias, and P. A. Holden. 2011. Biomagnification of cadmium selenide quantum dots in a simple experimental microbial food chain. *Nature Nanotechnology*, 6:65-71.
- Fairbairn, E.A., Keller, A.A., Mädler, L., Zhou, D., Pokhrel, S., and G.N. Cherr. 2011. Metal Oxide Nanomaterials in Seawater: Linking Physical Characteristics with Biological Response in Sea Urchin Development. *Journal of Hazardous Materials*, 192:1565-1571.
- Ford, T.E., A.L.Bass, S.Cheng, G.N.Cherr, B. Cole, E. Fairbairn, J.-D. Gu, R. S. Halbrook, F. E. Loffler, E. L. Madsen, and N.A. McGinn. 2011. EHPC 2010: sharing knowledge on environmental health for risk mitigation. *Ecotoxicology*, 20:937-939.
- Incardona, J.P., C.A. Vines, B.F. Anulacion, D.H. Baldwin, H.L. Day, B.L. French, J.S. Labenia, T.L. Linbo, M.S. Myers, O.P. Olson, C.A. Sloan, S. Sol, F.J. Griffin, K. Menard, S.G. Morgan, J.E. West, T.K. Collier, G.M. Ylitalo, G.N. Cherr, and N.L. Scholz. 2012. Unexpectedly high mortality in Pacific herring embryos exposed to the 2007 *Cosco Busan* oil spill in San Francisco Bay. *Proceedings of the National Academy of Sciences, USA*. 109(2):E51-58.
- Vines, C.A. and G.N. Cherr. 2012. Pollution: Emerging Contaminants. In: *Ecology, Conservation and Restoration of Tidal Marshes: The San Francisco Estuary*. A. Palaima, ed. University of California Press. pp. 67-86.
- Peterson, C.H., S.S. Anderson, G.N. Cherr, R.F. Ambrose, S. Anghera, S. Bay, M. Blum, R. Condon, T.A. Dean, M. Graham, M. Guzy, S. Hampton, S. Joye, J. Lambrinos, B. Mate, D. Meffert, S. P. Powers, P. Somasundaran, R.B. Spies, C.M. Taylor, R.Tjeerdema, and E.E. Adams. 2012. A Tale of Two Spills: Novel Science and Policy Implications of an Emerging New Oil Spill Model. *BioScience*, 62(5):461-469.
- Brander, S.M., B.J. Cole, and G.N. Cherr. 2012. An approach to detecting estrogenic endocrine disruption via choriogenin expression in an estuarine model fish species. *Ecotoxicology*, 21:1272-1280.
- Griffin, F.J., T. DiMarco, K.L. Menard, J.A. Newman, E.H. Smith, C.A. Vines, and G.N. Cherr. 2012. Impacts of suspended sediments on Pacific herring (*Clupea pallasii*) larval survival and condition. *Estuaries and Coasts*, 35(5):1229-1236.
- Incardona, J.P., C.A. Vines, T.L. Linbo, M.S. Myers, C.A. Sloan, B.F. Anulacion, D. Boyd, T.K. Collier, S.G. Morgan, G.N. Cherr and N.L. Scholz. 2012. Potent phototoxicity of

- marine bunker oil to translucent herring embryos after prolonged weathering. *PLoS ONE*, 7(2): e30116.
- Fairbairn, E.A., J. Bonthius, and G.N. Cherr. 2012. Polycyclic aromatic hydrocarbons and dibutyl phthalate disrupt dorsal-ventral axis determination via the *Wnt/β-catenin* signaling pathway in zebrafish embryos. *Aquatic Toxicology*, 124-125:188-196.
- Brander, S.M., G. He, K.L. Smalling, M.S. Denison, and G.N. Cherr. 2012. The *in vivo* estrogenic and *in vitro* anti-estrogenic activity of permethrin and bifenthrin. *Environmental Toxicology and Chemistry*, 31(12):2848-2855.
- Holden, P.A., R.M. Nisbet, H.S. Lenihan, R.J. Miller, G.N. Cherr, J.P. Schimel, and J.L. Gardea-Torresdey. 2013. Ecological nanotoxicology: Nanomaterial hazard considerations at the subcellular, population, community, and ecosystems levels. *Accounts of Chemical Research*, 46(3):813-822.
- Hwang, H.-M., R.S. Carr, G.N. Cherr, P.G. Green, E.D. Grosholz, L. Judah, S.G. Morgan, S. Ogle, V.K. Rashbrook, W.L. Rose, S.J. Teh, C.A. Vines, and S.L. Anderson. 2013. Sediment quality assessment in tidal salt marshes in northern California, USA: An evaluation of multiple lines of evidence approach. *Science of the Total Environment*, 454-455:189-198.
- Brander, S.M., R.E. Connon, G. He, J.A. Hobbs, K.L. Smalling, S.J. The, J. W. White, I. Werner, M.S. Denison, and G.N. Cherr. 2013. From ‘omics to otoliths: Responses of an estuarine fish to endocrine disrupting compounds across biological scales. *PLoS ONE*, 8(9).
- Cherr, G.N. 2013. Survival of drowning sperm: Do spermatozoa from external fertilizers adapt to differing osmotic environments through the use of aquaporins? *Biol. Reprod.*, 89(2):36, 1-2.
- Murata, K., F.S. Conte, E. McInnis, T.H. Fong, and G.N. Cherr. 2014. Identification of the origin and localization of chorion (egg envelope) proteins in an ancient fish, the white sturgeon, *Acipenser transmontanus*. *Biology of Reproduction*, 90(6): 132,1-12.
- Corsi, I., G.N. Cherr, H.S. Lenihan, J. Labille, M. Hasselov, L. Canesi, F. Dondero, G. Frenzilli, D. Hristozov, V. Puntes, G. Libralato, A. Marcomini, E. Sabbioni, and V. Matranga. 2014. Common strategies and technologies for the ecosafety assessment and design of nanomaterials entering the marine environment. *ACS Nano*, 8(10):9694-9709.
- Renick, V.C., T.W. Anderson, S.G. Morgan, and G.N. Cherr. 2015. Interactive effects of pesticide exposure and habitat structure on behavior and predation of a marine larval fish. 2014. *Ecotoxicology*, 24(2):391-400.

- Wu, B., C. Torres-Duarte, B.J. Cole, and G.N. Cherr. 2015. Copper oxide and zinc oxide nanomaterials act as inhibitors of multidrug resistance transport in sea urchin embryos: Their role as chemosensitizers. *Environmental Science and Technology*, 49:5760-5770.
- Cherr, G.N., C.A. Vines, E.H. Smith, M. Pillai, F.J. Griffin, R. Yanagimachi. 2015. Sperm Motility Initiation in Pacific Herring. In *The Flagellar Mechanics of Spermatozoa: Its Implication in Sperm Guidance*. Bentham Publishing, United Arab Emirates. J. Cosson, ed. pp. 189-204.
- Torres-Duarte, C., S.A. Adeyemi, S. Pokhrel, L. Mädler, A.A. Keller, and G.N. Cherr. 2015. Developmental effects of two different copper oxide nanomaterials in sea urchin (*Lytechinus pictus*) embryos. *Nanotoxicology*, 10(6):671-679.
- Yu, J., S. Liu, B. Wu, Z. Shen, G.N. Cherr, X-X. Zhang, and M. Li. 2016. Comparison of cytotoxicity and inhibition of membrane ABC transporters induced by MWCNTs with different length and functional groups. *Environmental Science & Technology*, 50(7):3985-3994.
- Cherr, G.N., E. Fairbairn, and A. Whitehead. 2017. Impacts of Petroleum-Derived Pollutants on Fish Development. *Annual Reviews of Animal Bioscience*, 5:185-203.
- Miller, R., E. Muller, B. Cole, T. Martin, R. Nisbet, G. Bielmyer-Fraser, T. Jarvis, A. Keller, G. Cherr, H. Lenihan. 2017. Photosynthetic efficiency predicts toxic effects of metal nanomaterials in phytoplankton. *Aquatic Toxicology*, 183:85-93.
- White, J. W., B. Cole, G. N. Cherr, R. Connon, and S. Brander. 2017. Scaling up the individual-level effects of endocrine disruptors: How many males does a population need? *Environmental Science & Technology*, 51:1802-1810.
- Yanagimachi, R., T. Harumi, H. Matsubara, W. Yan, S. Yuan, E. Yamaha, K. Arai, N. Hirohashi, I. Tomoriha, T. Matsubara, T. Andoh, C. Vines, and G. Cherr. 2017. Chemical and physical guidance of fish spermatozoa into the egg through the micropyle. *Biology of Reproduction*, 96(4):780-799.
- Keller, A.A., A.S. Adeleye, J.R. Conway, K.L. Garner, L. Zhao, G.N. Cherr, J. Hong, J.L. Gardea-Torresdey, H.A. Godwin, S. Hanna, Z. Ji, C. Kaweeteerawat, S. Lin, H. Lenihan, R. Miller, A.E. Nel, S.L. Walker, A.A. Taylor, C. Torres-Duarte, J. Zink, and N. Zuverza-Mena. 2017. Comparative environmental fate and toxicity of copper nanomaterials. *NanoImpact*, 7:28-40.
- Torres-Duarte, C., K.M. Ramos-Torres, R. Rahimoff, and G.N. Cherr. 2017. Stage specific effects of soluble copper and copper oxide nanoparticles during sea urchin embryo development and their relation to intracellular copper uptake. *Aquatic Toxicology*, 189:134-141.

**Gary N. Cherr, Ph.D.**  
**Curriculum Vitae**

Santillán-Urquiza, E., F. Arteaga-Cardona, C. Torres-Duarte, B. Cole, B. Wu, M.A. Méndez-Rojas, G.N. Cherr. 2017. Facilitation of trace metal uptake in cells by inulin coating of metallic nanoparticles. *Royal Society of Open Science*, 4: 170480.